

- 1) (currently amended) A rigid-flex printed circuit board system comprising, in combination:
  - a) at least one rigid layer;
  - b) wherein said at least one rigid layer comprises
    - i) at least one top side, and
    - ii) at least one bottom side;
  - c) at least one first flexible layer bonded to at least one first portion of said at least one top side;
  - d) at least one second flexible layer bonded to at least one second portion of said at least one bottom side;
  - e) wherein said at least one rigid layer comprises at least one first structural weakness at at least one first selected location;
  - f) wherein said at least one first structural weakness is ~~adapted~~ structured and arranged to facilitate breaking said at least one rigid layer at such at least one first selected location into at least two rigid pieces to provide a at least one first flexible connection formed by said at least one first flexible layer between such rigid pieces.
- 2) (previously presented) The rigid-flex printed circuit board system according to Claim 1 wherein such first structural weakness comprises at least one score that partially penetrates said at least one rigid layer.
- 3) (previously presented) The rigid-flex printed circuit board system according to Claim 1 wherein:

- a) said structural weakness comprises
  - i) at least one top score on said at least one top side at such at least one first selected location, and
  - ii) at least one bottom score on said at least one bottom side at such at least one first elected location.
- 4) (previously presented) The rigid-flex printed circuit board system according to Claim 1 wherein said at least one first structural weakness comprises at least one gap at such at least one first selected location between said at least one rigid layer and said at least one first flexible layer.
- 5) (previously presented) The rigid-flex printed circuit board system according to Claim 1 further comprising:
  - a) at least one adhesive to bond at least one flexible layer portion of said at least one first flexible layer to at least one rigid layer portion of said at least one rigid layer;
  - b) wherein said structural weakness comprises selective absence of adhesive at such selected location between said at least one rigid layer and said at least one flexible layer.
- 6) (previously presented) The rigid-flex printed circuit board system according to Claim 1 wherein said at least one first structural weakness comprises at least one laser score.
- 7) (previously presented) The rigid-flex printed circuit board system according to Claim 1 wherein said at least one first structural weakness comprises at least one mechanical score.

- 8) (original) The rigid-flex printed circuit board system according to Claim 1 wherein said at least one rigid layer comprises epoxy.
- 9) (original) The rigid-flex printed circuit board system according to Claim 1 wherein said at least one rigid layer comprises metal.
- 10) (original) The rigid-flex printed circuit board system according to Claim 1 wherein said at least one rigid layer comprises fiberglass.
- 11) (previously presented) The rigid-flex printed circuit board system according to Claim 1 wherein said at least one first flexible layer comprises polyimide.
- 12) (previously presented) The rigid-flex printed circuit board system according to Claim 1 wherein:
  - a) said at least one first flexible layer comprises
    - i) at least one substantially flexible insulating layer, and
    - ii) at least one substantially flexible conductive layer; and
  - b) said at least one rigid layer comprises
    - i) at least one substantially rigid insulating layer, and
    - ii) at least one conductive layer.
- 13) (original) A rigid-flex printed circuit board system comprising, in combination:
  - a) at least one substantially rigid layer;
  - b) at least one substantially flexible layer bonded to at least one portion of said at least one substantially rigid layer;
  - c) wherein said at least one substantially rigid layer comprises at least one structural weakness at at least one selected location to facilitate bending said at least one

rigid layer at such at least one selected location to provide at least one flexible connection.

- 14) (original) The rigid-flex printed circuit board system according to Claim 13 wherein said at least one substantially rigid layer comprises metal.
- 15) (original) The rigid-flex printed circuit board system according to Claim 13 wherein said at least one substantially rigid layer comprises aluminum.
- 16) (original) The rigid-flex printed circuit board system according to Claim 13 wherein said at least one structural weakness comprises at least one groove.
- 17) (original) The rigid-flex printed circuit board system according to Claim 13 wherein said at least one structural weakness comprises at least one chemically milled groove.
- 18) (withdrawn) A process of fabricating a rigid-flex printed circuit board system comprising the steps of:
  - a) bonding at least one portion of at least one flexible layer to at least one portion of at least one rigid layer;
  - b) peeling at least one portion of such at least one flexible layer away from such at least one rigid layer, at at least one selected location, to provide at least one flexible circuit portion.
- 19) (withdrawn) The process of fabricating a rigid-flex printed circuit board system according to Claim 18 further comprising the step of structurally weakening at least a portion of such flexible layer to assist in such peeling.

- 20) (withdrawn) The process of fabricating a rigid-flex printed circuit board system according to Claim 18 further comprising the step of cutting at least one portion of such flexible layer to assist in such peeling.
- 21) (withdrawn) The process of fabricating a rigid-flex printed circuit board system according to Claim 18 wherein:
- a) such bonding comprises selectively applied adhesive;
  - b) such adhesive is selectively applied to substantially omit adhesive from being applied, at such at least one selected location, between such at least one flexible layer and such at least one rigid layer to assist in such peeling.
- 22) (withdrawn) The process of fabricating a rigid-flex printed circuit board system according to Claim 18 further comprising the steps of:
- a) applying an adhesive to form such bonding;
  - b) selectively removing at least one portion of such adhesive, at such at least one selected location, between such at least one flexible layer and such at least one rigid layer to assist in such peeling.
- 23) (withdrawn) A process of fabricating a rigid-flex printed circuit board system comprising the steps of:
- a) bonding at least one portion of at least one flexible layer to at least one portion of at least one rigid layer;
  - b) breaking at least one portion of such at least one rigid layer, at at least one selected location, into at least two pieces;

- c) wherein such at least one flexible layer provides a flexible connection, at such at least one selected location, between such at least two pieces.
- 24) (withdrawn) The process of fabricating a rigid-flex printed circuit board system according to Claim 23 further comprising the step of structurally weakening, at such at least one selected location, at least one portion of said at least one rigid layer to assist in such breaking.
- 25) (withdrawn) The process of fabricating a circuit board system according to Claim 23 further comprising the step of scoring such at least one rigid layer, at such at least one selected location, to assist in such breaking.
- 26) (withdrawn) The process of fabricating a rigid-flex printed circuit board system according to Claim 25 wherein such scoring comprises a process selected from the group consisting of
- a) laser scoring
  - b) mechanically scoring
  - c) mechanically punching.
- 27) (withdrawn) The process of fabricating a rigid-flex printed circuit board system according to Claim 23 further comprising the steps of:
- a) applying an adhesive to form such bonding;
  - b) selectively removing at least a portion of such adhesive, at such at least one selected location, between such flexible layer and such rigid layer to assist in such breaking.

- 28) (withdrawn) The process of fabricating a rigid-flex printed circuit board system according to Claim 23 wherein:
- a) such bonding comprises selectively applied adhesive;
  - b) such adhesive is selectively applied to substantially omit adhesive from being applied, at such at least one selected location, between such flexible layer and such rigid layer to assist in such breaking.
- 29) (withdrawn) A process of fabricating a rigid-flex printed circuit board system comprising to steps of:
- a) bonding at least one flexible layer to at least one rigid layer;
  - b) wherein such flexible layer comprises a conductive layer;
  - c) etching said flexible layer after such flexible layer has been bonded to such outer surface of such rigid layer;
  - d) breaking, at a selected location, at least one portion of such rigid layer into at least two rigid pieces after such flexible layer has been bonded to such outer surface of such rigid layer;
  - e) wherein such flexible layer provides a flexible connection, at the location of the break, between such pieces of such rigid layer.
- 30) (withdrawn) The process of fabricating a rigid-flex printed circuit board system according to Claim 29 further comprising the step of selective removal of at least a portion of said rigid layer to assist in such breaking.

- 31) (withdrawn) The process of fabricating a rigid-flex printed circuit board system according to Claim 30 wherein at least one laser is used to accomplish at least a portion of such selective removal.
- 32) (withdrawn) The process of fabricating a rigid-flex printed circuit board system according to Claim 30 wherein mechanical abrasion is used to accomplish at least a portion of such selective removal.
- 33) (withdrawn) The process of fabricating a circuit board system according to Claim 30 wherein mechanical impact is used to accomplish at least a portion of such selective removal.
- 34) (withdrawn) The process of fabricating a rigid-flex printed circuit board system according to Claim 29 further comprising the step of selectively removing at least a portion of said rigid layer, before bonding such at least one flexible layer to at least one outer surface of such rigid layer, to assist in such breaking.
- 35) (withdrawn) The process of fabricating a rigid-flex printed circuit board system according to Claim 29 further comprising the step of selectively removing at least a portion of adhesive between such flexible layer and such rigid layer to assist in such breaking.
- 36) (withdrawn) The process of fabricating a rigid-flex printed circuit board system according to Claim 29 wherein:
  - a) such flexible layer is bonded to such rigid layer with an adhesive layer;
  - b) such adhesive layer is selectively applied to avoid placing adhesive at such selected location.



37) (withdrawn) The process of fabricating a rigid-flex printed circuit board system according to Claim 29 wherein:

- a) such rigid layer comprises material selected from the group consisting essentially of
  - i) tri-functional epoxy resin
  - ii) multifunctional epoxy resin
  - iii) fiberglass reinforced material
  - iv) cast coated non-reinforced epoxy resin
  - v) cast coated non-reinforced polyimide resin
  - vi) aluminum
  - vii) copper
  - viii) semiconductor.

38) (withdrawn) The process of fabricating a rigid-flex printed circuit board system according to Claim 29 wherein:

- a) such flexible layer comprises material selected from the group consisting essentially of
  - i) polyimide film
  - ii) poly-ethylene naphthalate film
  - iii) polyester film
  - iv) liquid crystal polymer film
  - v) fiberglass reinforced epoxy.

- 39) (withdrawn) A process of fabricating a rigid-flex printed circuit board system comprising the steps of:
- a) laminating at least one portion of at least one flexible layer to at least one portion of at least one rigid layer;
  - b) plating, imaging, and etching at least one portion of such at least one flexible layer to form conductor patterns after such at least one portion of at least one flexible layer has been laminated to such at least one portion of at least one rigid layer;
  - c) breaking at least one portion of such at least one rigid layer, at at least one selected location, into at least two pieces;
  - d) wherein such at least one flexible layer provides a flexible conductive connection, at such at least one selected location, between such at least two pieces.

- 40) (previously presented) A rigid-flex printed circuit board system comprising, in combination:
- a) insulating means for electrically insulating conductive portions of the rigid-flex printed circuit board;
  - b) conducting means for conducting electricity through portions of the rigid-flex printed circuit board;
  - c) rigidity means for providing rigidity to all portions of said conducting means;
  - d) conversion means for converting portions of rigidity means into a flexible means for flexing portions of said conductor means;
  - e) wherein said conversion means comprises structural weakness means for structurally weakening selected portions of said rigidity means;
  - f) wherein said structural weakness means comprises at least one score that partially penetrates said rigidity means.
- 41) (canceled)
- 42) (previously presented) The rigid-flex printed circuit board system according to Claim 1 wherein
- a) said at least one first flexible layer comprises at least one top outermost layer; and
  - b) said at least one second flexible layer comprises at least one bottom outermost layer.
- 43) (previously presented) The rigid-flex printed circuit board system according to Claim 1 further comprising at least one breakaway portion.

- 44) (previously presented) The rigid-flex printed circuit board system according to Claim 1 wherein:
- a) said at least one rigid layer comprises at least one second structural weakness at at least one second selected location;
  - b) said at least one second structural weakness is adapted to facilitate breaking said at least one rigid layer at such at least one second selected location into at least two second rigid pieces to provide at least one second flexible connection formed by said at least one second flexible layer between such second rigid pieces.
- 45) (previously presented) The rigid-flex printed circuit board system according to Claim 44 wherein
- a) said at least one first flexible connection is structured and arranged to provide upwardly concave flexure at said at least one first selected location; and
  - b) said at least one second flexible connection is structured and arranged to provide downwardly concave flexure at said at least one second selected location.
- 46) (n previously presented) The rigid-flex printed circuit board system according to Claim 2 wherein said at least one score penetrates about two-thirds of the total thickness of said at least one rigid layer.
- 47) (previously presented) A rigid-flex printed circuit board system comprising, in combination:
- a) at least one rigid layer;
  - b) at least one flexible layer bonded to at least one portion of said at least one rigid layer;

- c) wherein said at least one rigid layer comprises at least one structural weakness at at least one selected location;
  - d) wherein said at least one structural weakness is adapted to facilitate breaking said at least one rigid layer at such at least one selected location to provide at least one flexible end portion.
  - e) wherein said at least one flexible end portion comprises
    - i) at least one flexible insulating layer, and
    - ii) at least one flexible conductive layer.
- 48) (previously presented) The rigid-flex printed circuit board system according to Claim 47 wherein said at least one flexible end portion comprises at least one conductive trace.
- 49) (previously presented) The rigid-flex printed circuit board system according to Claim 47 wherein said at least one flexible end portion comprises at least one conductive pad.
- 50) (previously presented) The rigid-flex printed circuit board system according to Claim 47 wherein said at least one flexible end portion comprises at least one peel-away portion.